Call for Research Proposals

Title: **Wildlife Impact Reduction Strategies from Wind Energy Development in Texas**

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Introduction

Wind energy continues to be a growing source of renewable energy that decreases the need for carbon-based energy. Although it does not consume water resources or emit wastewater, it is not without impacts to wildlife with documented mortality to bird and bat species at all wind energy facilities with publicly available data. In the U.S., Texas is the leading producer of wind energy with an installed wind power capacity of over 15,000 MW, accounting for 23% of the current total U.S. installed capacity. In addition, Texas also ranks as having the highest diversity of birds and bats in the nation, with 639 avian and 32 bat species. However, research on the impact of wind energy on wildlife in the Southwest and Texas is lacking with all peer-reviewed studies originating from a single facility.

Avian fatality rates have typically ranged from three to five birds per MW per year, but have been as high as 14 birds per MW per year, with small passerines constituting approximately 60% of national mortalities. Documented mortalities occur in many other avian families, such as waterfowl, raptors, owls, and upland game birds. Significant impacts to raptors, including hawks and eagles, have occurred at several facilities in the U.S.

Bat fatality rates have ranged from one to greater than 30 per MW per year in the U.S. While 21 species of bats have documented mortality at wind energy facilities, the majority of reported fatalities are for tree-roosting species including the hoary bat (*Lasiurus cinereus*), eastern red bat (*Lasiurus borealis*), and silver-haired bat (*Lasionycteris noctivagans*). However, considerable uncertainty exists whether these data are influenced by sampling bias due to the very limited amount of publicly available data from the southwestern U.S. The species composition and abundance in this region, where Brazilian free-tailed bats (*Tadarida brasiliensis*) occur in large colonies numbering in the millions, varies from that of the northeast. In addition, little is known about other lasiurine species occurring in the Southwest, such as the northern and southern yellow bat (*L. intermedius* and *L. ega*, respectively), which have the potential for mortalities at wind energy facilities.

Timing of fatality events is reported for many facilities and is a research topic of interest. Peaks in mortality typically occur in the spring and fall for birds and bats, with the highest bat fatality rates occurring in late summer and early fall. In addition, the majority of impacted avian species are migratory. This, in combination with the timing of peak events, suggests that high fatality events occur during migration. Texas is within the central migratory flyway, traversed each year by millions of birds and bats during spring and fall migration, making it a location of primary concern. Understanding potential impacts to wildlife populations in Texas, including game species such as northern bobwhite (*Colinus virginianus*) and mourning dove (*Zenaida macroura*), and developing impact reduction strategies are important for conserving not only wildlife in Texas, but

across the U.S. We are requesting proposals for research on mitigation of wildlife impacts from wind energy development in Texas.

Justification

Birds and bats play critical roles in Texas ecosystems. Birds function as pollinators, seed dispersers, and as food sources for many predators. In addition, wildlife watchers spent $54.9 billion in the U.S. in 2011, much of which was expenditures for birding. Bats provide major economic benefits to agricultural producers, estimated to be in the billions worldwide, in the form of reducing agricultural pests, and create economic benefits to cities like Austin, Texas from tourism.

Despite the availability of research from the Northeast on wildlife impacts from wind energy development, many unanswered questions remain. Relationships between bird and bat behavior and mortality at wind turbines are not well understood. Concerns about ecological and population level impacts to bats exist with little known. In addition, questions remain about effectiveness of impact reduction strategies, such as turbine design and operational minimization in relation to weather patterns.

Understanding real and potential impacts to wildlife populations at wind energy facilities in Texas and developing impact reduction strategies are important conservation actions not only for wildlife in Texas, but across the U.S.

In May 2015, the American Wind Wildlife Institute (AWWI) published the Wind Turbine Interactions with Wildlife and their Habitats: A Summary of Research Results and Priority Questions. This report states:

> *"Much uncertainty remains as to the distribution, timing, and magnitude of collision fatalities in both birds and bats. Some of this uncertainty reflects the lack of data from particular regions of the country. For example, we are aware of only one publicly available fatality report from the southwestern U.S."*

The U.S. Fish and Wildlife Service (USFWS) Land-Based Wind Energy Guidelines outline voluntary recommendations for addressing wildlife impact concerns in a tiered approach for all stages (pre- and post-construction) of land-based wind energy development. The goals of these guidelines are to mitigate and/or avoid impacts to wildlife species, including birds and bats. These guidelines are used by most wind energy developers in the U.S.; however more research is needed to document and refine their effectiveness.

Objectives

1. Identify impacts to bird and bat populations at a wind energy facility in Texas using pre- and post-construction monitoring data.

2. Test and/or refine impact reduction strategies (e.g. operational minimization and/or acoustic deterrents) for decreasing wildlife impacts that can be applied at the national level.

3. Study bird and bat behavior at wind turbines in order to better understand causes of mortality.

4. Publish one or more articles in a peer-reviewed scientific journal on the impacts of wind energy on known susceptible species, such as hoary bats, silver-haired bats, eastern red bats, Brazilian free-tailed bats, upland game birds, Red-tailed Hawks (*Buteo jamaicensis*), etc., as well as species lacking studies that are of conservation concern, such as Crested Caracara (*Caracara cheriway*), White-tailed Hawks (*Buteo albicaudatus*), and southern yellow bats.

Example hypotheses that may be considered:

- Avian and bat use and mortality patterns will differ from those reported in at other wind energy facilities in the U.S.
- Operational minimization efforts will prove effective for mitigating wildlife impacts in Texas.
- Avian and bat behavior at wind turbines will reflect causes of mortality from collisions with turbine blades.

Preference will be given to proposals that:

- Address more of the above objectives on more areas (proposed construction sites).
- Address specific theoretical or statistical hypotheses similar to those outlined above.
- Are less than 4 years in duration.
- Contribute to improving impact reduction strategies nationally.
- Contribute to finalizing TPWD's Draft Voluntary Recommendations for Wind Energy Development.

All applicants will be expected to comply with TPWD private land access requirements contained in statutes (Section 12.103 Entering Land; Use of Information Obtained by Entry of TPW Code) and attendant policies. Generally this includes landowner written permission allowing entry to private land for purposes of scientific investigations and research and to gather, store and use that data (see application instructions and form).

Expected Management Implications

This project will contribute to the current pool of knowledge on wind energy and wildlife impacts in the U.S. and help to refine impact reduction strategies for decreasing impacts. In addition, it will contribute to finalizing TPWD's Draft Voluntary Recommendations for Wind Energy Development providing data on the states unique suite of species allowing for more refined recommended best management practices (BMPs).